

GATEWAY SERVER IN WHICH PICTURE CONTENTS CAN BE  
DISPLAYED IN SMALL TERMINAL, AND PROCESSING SPEED  
IS FAST, AND MANUFACTURING COST IS CHEAP,  
AND METHOD OF OBTAINING CONTENTS

5

## Background of the Invention

### 1. Field of the Invention

The present invention relates to a gateway  
server and a method of obtaining a contents. More  
particularly, the present invention relates to a  
gateway server for arbitrating a communication  
between a small terminal and a contents server,  
and a method of obtaining a contents.

### 2. Description of the Related Art

As shown in Fig. 1, small terminals 1-1 to  
1-4 are connected through a network infrastructure  
4 to a gateway server 2. The gateway server 2 is  
also connected through the network infrastructure  
4 to contents servers 3-1 to 3-4.

The small terminals 1-1 to 1-4, when  
receiving a request of a contents retrieval from a  
user, requests the gateway server 2 to retrieve  
the contents, and displays the contents retrieved  
through the I/O device 2 from the contents servers  
3-1 to 3-4.

The gateway server 2 is the device for

carrying out an arbitration between the small  
terminals 1-1 to 1-4 and the contents servers 3-1  
to 3-4. It accepts a request of a contents  
retrieval from the small terminals 1-1 to 1-4. It  
5 checks whether the contents requested from the  
small terminals 1-1 to 1-4 is present on a LAN or  
present on an Internet 5. If the contents is  
present on the LAN, it requests the contents  
servers 3-1 to 3-4 on the LAN to retrieve the  
10 contents requested from the small terminals 1-1 to  
1-4. If the contents is present on the Internet 5,  
it requests the contents servers 3-1 to 3-2 on the  
Internet 5 to retrieve the contents requested from  
the small terminals 1-1 to 1-4. If the gateway  
15 server 2 succeeds in retrieving the contents  
requested through the small terminals 1-1 to 1-4  
from the contents servers 3-1 to 3-4, distributes  
the retrieved contents to the small terminals 1-1  
to 1-4.

20 The contents servers 3-1 to 3-4 are the  
devices for storing therein the contents and  
distributing the requested contents. They search  
for the contents requested from the gateway server  
2 through the contents servers 3-1 to 3-4. If  
25 they can search for the contents, the contents  
servers 3-1 to 3-4 retrieve the searched contents,  
and distribute to the gateway server 2 of the

request source. If the contents can not be  
searched, the contents servers 3-1 to 3-4  
distribute an error message indicative of an  
absence of the contents to the gateway server 2 of  
5 the request source.

The network infrastructure 4 is the  
communication network to which the small terminal  
1, the gateway server 2 and the contents server 3  
are connected. The distributed contents on which  
10 the request of the contents retrieval is performed  
flows through the communication network.

The gateway server 2 simply relays the  
request of the contents retrieval from the small  
terminals 1-1 to 1-4 and the contents to the  
15 contents servers 3-1 to 3-4 and the small  
terminals 1-1 to 1-4. Thus, there may be a case  
that the requested contents is a picture contents,  
and thereby the display performance of the small  
terminals 1-1 to 1-4 is not sufficient, and  
20 accordingly the retrieved picture contents is not  
correctly displayed on the small terminals 1-1 to  
1-4. In order to display the picture contents on  
the small terminals 1-1 to 1-4, a generator of the  
contents must generate two kinds of picture  
25 contents for a typical terminal and a small  
terminal.

A known server apparatus noted in Japanese

Laid Open Patent Application (JP-A-Heisei, 11-250009) receives a release information of a terminal together with a request of a contents retrieval of the terminal, and performs a data conversion on the retrieved contents so as to match with the terminal, in accordance with the release information. Also, the server apparatus stores therein a database of a release information correlated with an ID of the terminal, and receives the ID of the terminal together with the request of the contents retrieval of the terminal, and captures the release information corresponding to the ID from the database, and then performs the data conversion on the retrieved contents so as to match with the terminal. Such a server apparatus must change a method of converting a data, in accordance with the release information. Thus, its process is complex, and its processing speed is slow. Moreover, such a server apparatus requires a memory for storing therein the database. Hence, its manufacturing cost is further expensive.

Japanese Laid Open Patent Application (JP-A-Heisei, 10-149309) discloses a digital picture information accumulation system as described below. Installation terminals are installed at a plurality of locations at streets. A digital picture information obtained by the portable

terminal during a movement is transferred at a high speed to the installation terminal at any position, and transiently accumulated in it. Then, an attribute information of the accumulated stored digital picture information is generated and transferred to a digital information server connected through a first network, and unitarily managed. This digital information server connects an installation terminal accumulating therein a digital picture information of a concerned person, to a computer of the concerned person of a house or an office accessing through a second network, and then transfers its digital picture information to the computer.

Japanese Laid Open Patent Application (JP-A-Heisei, 10-162002) discloses an Internet browsing apparatus. The visibility and the operational performance can be improved by mounting: a picture data expander for expanding a reception picture data, generating a picture data and obtaining a picture size; a screen size setter for setting a size of a display screen size; and a display position modifier for calculating display positions of a character and a picture from a reception character data and the picture size and modifying the display positions so as to satisfy a lateral size of the display screen.

### Summary of the Invention

The present invention is accomplished in view of the above mentioned problems. Therefore, an object of the present invention is to provide a gateway server in which a picture contents can be displayed in a small terminal, and a processing speed is fast, and a manufacturing cost is cheap.

In order to achieve an aspect of the present invention, a gateway server, includes: a convert section converting a first contents into a second contents, wherein the first contents is received from a contents server in response to a request of a small terminal and the second contents corresponds to a display performance of a display section of the small terminal; and an output section outputting the second contents to the small terminal.

In this case, the small terminal is one of a portable wireless telephone, a PHS terminal and a personal digital assistant.

Also in this case, the second contents can be displayed in the display section.

Further in this case, the convert section judges whether the first contents is a picture contents, and when the first contents is not the picture contents, the convert section does not convert the first contents into the second

contents.

In this case, the convert section does not convert the first contents into the second contents, when the first contents is received from the contents server in response to a request of a non-small terminal other than the small terminal, and wherein the output section outputs the first contents to the non-small terminal.

Also in this case, the display performance corresponds to the number of display pixels of the display section.

Further in this case, the display performance corresponds to the number of display colors of the display section.

In order to achieve another aspect of the present invention, a contents obtaining system, includes: a terminal having a display section to display a contents; a contents server storing a contents; and a gateway server arbitrating a communication between the terminal and the contents server, and wherein the terminal outputs a first request of obtaining a needed contents to the gateways server, and wherein the gateway server outputs a second request of obtaining the needed contents to the contents server in response to the first request, and wherein the contents server outputs the needed contents to the gateway

server in response to the second request, and wherein the gateway server converts the needed contents into a specific contents, wherein the specific contents corresponds to a display performance of the display section of the terminal, and wherein the gateway server outputs the specific contents to the terminal.

In this case, the gateway server judges whether the needed contents is a picture contents, and wherein when the needed contents is not the picture contents, the gateway server does not convert the needed contents into the specific contents and the gateway server outputs the needed contents instead of the specific contents to the terminal.

Also in this case, the terminal is one of a small terminal and a terminal other than the small terminal, and wherein when the terminal is the small terminal, the terminal outputs the first request of obtaining the needed contents to the gateways server, the first request including a information indicating that the terminal is the small terminal, and wherein the gateway server does not convert the needed contents into the specific contents when the gateway server does not receive the information.

In order to achieve still another aspect of



the present invention, a contents obtaining method, includes: (a) outputting a first request of obtaining a contents to a gateways server from a terminal; (b) outputting a second request of  
5 obtaining the contents to a contents server from the gateway server in response to the first request; (c) outputting the contents to the gateway server from the contents server in response to the second request; (d) converting the  
10 contents into a specific contents in the gateway server, wherein the specific contents corresponds to a display performance of a display section of the terminal; and (e) outputting the specific contents to the terminal from the gateway server.

15 In this case, the contents obtaining method, further includes: (f) judging whether the contents is a picture contents, and wherein when the contents is not the picture contents as the result of the (f), the (d) is not performed and the (e)  
20 includes outputting the contents instead of the specific contents to the terminal from the gateway server.

Also in this case, the terminal is one of a small terminal and a terminal other than the small  
25 terminal, and wherein when the terminal is the small terminal, the (a) includes outputting the first request of obtaining the contents to the

gateways server from the terminal, the first  
request including a information indicating that  
the terminal is the small terminal, and wherein  
the (d) is not performed when the gateway server  
5 does not receive the information.

In order to achieve yet still another  
aspect of the present invention, a computer  
readable recording medium for recording a program  
for a process, includes: (a) converting a first  
10 contents into a second contents, wherein the first  
contents is received from a contents server in  
response to a request of a small terminal and the  
second contents corresponds to a display  
performance of a display section of the small  
15 terminal; and (b) outputting the second contents  
to the small terminal.

In this case, the small terminal is one of  
a portable wireless telephone, a PHS terminal and  
a personal digital assistant.

20 Also in this case, the second contents can  
be displayed in the display section.

Further in this case, the computer readable  
recording medium for recording a program for a  
process, further includes: (c) judging whether the  
25 first contents is a picture contents; and wherein  
the (a) is not performed when the first contents  
is not the picture contents as the result of the

(c).

In this case, the (a) is not performed when the first contents is received from the contents server in response to a request of a non-small terminal other than the terminal, and wherein the (b) includes outputting the first contents to the non-small terminal when the (a) is not performed.

Also in this case, the display performance corresponds to the number of display pixels of the display section.

Further in this case, the display performance corresponds to the number of display colors of the display section.

#### Brief Description of the Drawings

Fig. 1 is a view showing an embodiment of a gateway server according to the present invention;

Fig. 2 is a circuit block diagram showing a small terminal in the embodiment of the gateway server according to the present invention;

Fig. 3 is a circuit block diagram showing a gateway server in the embodiment of the gateway server according to the present invention;

Fig. 4 is a circuit block diagram showing a contents server in the embodiment of the gateway server according to the present invention;

Fig. 5 is a time chart showing an

embodiment of a method of obtaining a contents according to the present invention; and

Fig. 6 is a time chart showing an embodiment of a method of obtaining a contents according to the present invention.

### **Description of the Preferred Embodiments**

Preferred embodiments of the present invention will be described referring to the relevant drawings.

An embodiment of a gateway server according to the present invention is the gateway server for mainly arbitrating a communicating between a small terminal and a contents server.

As shown in Fig. 2, a small terminal 1 is provided with a CPU 11, an external input/output device 12, a timer device 13, an input device 14 and a display 15. The CPU 11 is connected to the external input/output device 12, the timer device 13, the input device 14 and the display 15. The small terminal can be a portable wireless telephone, a PHS terminal, or a personal digital assistant.

The CPU 11 instructs the display 15 to display a request of a contents retrieval accepted from the input device 14, and instructs the external input/output device 12 to transmit the

request of the contents retrieval, and then instructs the display 15 to display the retrieved contents.

The external input/output device 12 is an interface portion with a network infrastructure 4. It passes a message or a contents received from a gateway server 2 to the CPU 11, or it transmits the request of the contents retrieval received from the CPU 11 to the gateway server 2, in accordance with the instruction of the CPU 11.

The timer device 13 has a built-in timer to wait for an retrieval of a contents of the CPU 11. A timer is started in accordance with the instruction of the CPU 11. The timer is stopped after a predetermined period from the start. The timer device 13 reports the stop of the timer to the CPU 11. Also, the timer device 13 can stop the timer during the operation, in accordance with the instruction of the CPU 11.

The input device 14 is a portion for receiving a request of a contents retrieval from a user. It passes the received request to the CPU 11. The display 15 is a portion for displaying the contents. It displays the request of the contents retrieval from the user, or a message, in accordance with the instruction of the CPU 11.

As shown in Fig. 3, the gateway server 2 is

provided with a CPU 21, an external input/output device 22, a timer device 23, a contents accumulator 24, a contents request table 25 and a picture contents conversion work area 26. The CPU 21 is connected to the external input/output device, the timer device 23, the contents accumulator 24, the contents request table 25 and the picture contents conversion work area 26.

The CPU 21 controls the external  
10 input/output device 22, the timer device 23, the  
contents accumulator 24, the contents request  
table 25 and the picture contents conversion work  
area 26. Also, the CPU 21 initially has the data  
with regard to the number of display pixels and  
15 the number of display colors of the small terminal  
1. Then, it converts a retrieved picture contents  
into a contents that can be displayed on the small  
terminal 1 in accordance with the data.

The external input/output device 22 is an interface portion with the network infrastructure 4. It transmits a contents or a message to the small terminal 1, in accordance with the instruction of the CPU 11, or transmits a request of a contents retrieval to the contents server 3. Moreover, it passes the request of the contents retrieval received from the small terminal 1 and the contents received from the contents server 3

to the CPU 21.

The timer device 23 has a built-in timer to wait for an retrieval of a contents of the CPU 21.

A timer is started in accordance with the instruction of the CPU 21. The timer is stopped after a predetermined period from the start. The timer device 23 reports the stop of the timer to the CPU 21. Also, the timer device 23 can stop the timer during the operation, in accordance with the instruction of the CPU 21.

The contents accumulator 24 is a portion for storing therein a contents. It stores therein a contents retrieved from the contents server 3, in accordance with the instruction of the CPU 11, passes the stored contents to the CPU 21, and deletes the stored contents.

The contents request table 25 is a portion for storing therein a request of a contents retrieval received from the small terminal 1. It stores therein the request of the contents retrieval received from the small terminal 1, in accordance with the CPU 21, and deletes it.

The picture contents conversion work area 26 is an area for converting a picture contents into a contents satisfying the number of display pixels and the number of display colors of the small terminal 1. It is used by the CPU 21 when

the picture contents is converted into the contents satisfying the number of display pixels and the number of display colors of the small terminal 1.

5           The contents server is a device for storing  
therein a contents and distributing a requested  
contents. A contents requested by the gateway  
server is retrieved from the contents server and  
distributed to the gateway server.

As shown in Fig. 4, the contents server 3 is provided with a CPU 31, an external input/output device 32, a timer device 33 and a contents accumulator 34. The CPU 31 is connected to the external input/output device 32, the timer device 33 and the contents accumulator 34.

The CPU 31 retrieves the contents requested by the gateway server 2 by searching for it through the contents accumulator 34, and then instructs the external input/output device 32 to transmit the retrieved contents.

The external input/output device 32 is an interface portion with the network infrastructure 4. It passes a request of a contents retrieval received from the gateway server 2, or transmits the contents passed by the contents accumulator 34 to the gateway server 2, in accordance with the instruction of the CPU 31.



The timer device 33 has a built-in timer to wait for an retrieval of a contents of the CPU 31. A timer is started in accordance with the instruction of the CPU 31. The timer is stopped  
5 after a predetermined period from the start. The timer device 33 reports the stop of the timer to the CPU 31. Also, the timer device 33 can stop the timer during the operation, in accordance with the instruction of the CPU 31.

10 The contents accumulator 34 is a portion for storing therein a contents. It passes the stored contents to the CPU 31, in accordance with the instruction of the CPU 11.

In the operation of the small terminal 1,  
15 the input device 14 receives the request of the contents retrieval from the user, as shown in Fig. 5. It passes the received request of the contents retrieval to the CPU 11. The CPU 11 instructs the display 15 to display the request of the contents  
20 retrieval, and instructs the external input/output device 12 to transmit the request of the contents retrieval. The display 15 displays a message of the request of the contents retrieval in accordance with the instruction of the CPU 11.

25 The external input/output device 12 transmits the request of the contents retrieval through the network infrastructure 4 to the gateway server 2

in accordance with the instruction of the CPU 11.  
After the external input/output device 12  
transmits the request of the contents retrieval,  
the CPU 11 instructs the timer device 13 to start  
5 the timer. The timer device 13 starts the timer  
in accordance with the instruction of the CPU 11.

When the external input/output device 12  
receives the contents requested by the small  
terminal 1 from the gateway server 2, the external  
10 input/output device 13 passes the received  
contents to the CPU 11. The CPU 11 receiving the  
contents instructs the timer device 13 to stop the  
timer. The timer device 13 stops the timer in  
accordance with the instruction of the CPU 11.

15 If the reception of the requested contents  
is completed, the CPU 11 instructs the display 15  
to display the retrieved contents. The display 15  
displays the contents in accordance with the  
instruction of the CPU 11.

20 If the reception of the requested contents  
is not completed (51), the CPU 11 again instructs  
the timer device 13 to start the timer. The timer  
device 13 starts the timer in accordance with the  
instruction of the CPU 11. After that, if the  
25 reception of the contents is completed, the CPU 11  
instructs the timer device 13 to stop the timer,  
and instructs the display 15 to display the

retrieved contents. The timer device 13 stops the timer in accordance with the instruction of the CPU 11. The display 15 displays the contents, in accordance with the instruction of the CPU 11.

5 If the external input/output device 12 receives a message indicative of a failure in the contents retrieval from the gateway server 2, the external input/output device 12 passes this message to the CPU 11, as denoted by symbols 62, 10 63 of Fig. 6. The CPU 11 receiving this message instructs the timer device 13 to stop the timer, and instructs the display 15 to display the message indicative of the failure in the contents retrieval. The timer device 23 stops the timer in 15 accordance with the instruction of the CPU 11. The display 15 displays the message indicative of the failure in the contents retrieval, in accordance with the instruction of the CPU 11.

If the timer of the timer device 13 becomes 20 at a time-out state, the timer device 13 reports the time-out to the CPU 11, as denoted by a symbol 61 of Fig. 6. The CPU 11 receiving the report of the time-out judges as the failure in the contents retrieval, and instructs the display 15 to display 25 a message instructive of the failure in the contents retrieval. The display 15 displays the message of the failure in the contents retrieval

in accordance with the instruction of the CPU 11.

In the operation of the gateway server 2, the external input/output device 22 receives a request of a contents retrieval from the small terminal 1, as shown in Fig. 5. It passes the received request of the contents retrieval to the CPU 21. The CPU 21 stores the request of the contents retrieval in the contents request table 25, and instructs the external input/output device 22 to transmit the request of the contents retrieval. The external input/output device 22 transmits the request of the contents retrieval to the contents server 3, in accordance with the instruction of the CPU 21. After the completion of the transmission of the request of the contents retrieval, the CPU 21 instructs the timer device 23 to start the timer. The timer device 23 starts the timer in accordance with the instruction of the CPU 21.

If the external input/output device 22 receives the requested contents from the contents server 3, the external input/output device 22 passes the received contents to the CPU 21. The CPU 21 receiving the contents stores the contents in the contents accumulator 24, and instructs the timer device 23 to stop the timer. The timer device 23 stops the timer in accordance with the

instruction of the CPU 21. If the reception of the requested contents is completed, it is judged whether or not the received contents is a picture contents.

5           If the reception of the requested contents is not completed (52), the CPU 21 again instructs the timer device 23 to start the timer. The timer device 23 starts the timer in accordance with the instruction of the CPU 21. After that, if the  
10 reception of the contents is completed, the CPU 21 judges whether or not the received contents is the picture contents, and instructs the timer device 13 to stop the timer. The timer device 23 stops the timer in accordance with the instruction of  
15 the CPU 21.

          If it is judged that the received contents is the picture contents (53), the CPU 21 retrieves the contents from the contents accumulator 24. It uses the picture contents conversion work area 26,  
20 and converts the retrieved contents into the contents satisfying the data with regard to the number of display pixels and the number of display colors initially owned by the CPU 21. It replaces the contents stored in the contents accumulator 24  
25 with the converted contents.

          If it is judged that the received contents is not the picture contents, or if the retrieved

contents is already converted into the contents satisfying the number of display pixels and the number of display colors of the small terminal 1 since it is judged as the picture contents, the  
5 CPU 21 retrieves the contents from the contents accumulator 24, and instructs the external input/output device 22 to transmit the contents. The external input/output device 22 transmits the contents to the small terminal 1, in accordance  
10 with the instruction of the CPU 21. After the external input/output device 22 transmits the contents, the CPU 21 deletes the contents after the end of the transmission from the contents accumulator 24, and deletes the request of the  
15 contents retrieval transmitted by the contents request table 25.

If the external input/output device 22 receives a message indicative of a failure in the contents retrieval from the contents server 3, the  
20 external input/output device 23 passes this message to the CPU 21, as denoted by a symbol 63 of Fig. 6. The CPU 21 receiving this message instructs the timer device 23 to stop the timer, and instructs the external input/output device 22  
25 to transmit the message indicative of the failure in the contents retrieval. The timer device 23 stops the timer in accordance with the instruction

of the CPU 21. The external input/output device 22 transmits the message indicative of the failure in the contents retrieval to the small terminal 1 in accordance with the instruction of the CPU 21.

5 After the transmission of the message, the CPU 21 deletes the request of the contents retrieval that can not be retrieved because of the failure in the retrieval from the contents request table 25. If there is any contents retrieved until the middle,  
10 it deletes its contents from the contents accumulator 24.

If the timer of the timer device 23 becomes at a time-out state (62), the timer device 23 reports the time-out to the CPU 21. The CPU 21  
15 receiving the report of the time-out instructs the external input/output device 22 to transmit the message indicative of the failure in the contents retrieval. The external input/output device 22 transmits the message indicative of the failure in  
20 the contents retrieval to the small terminal 1 in accordance with the instruction of the CPU 21. After the transmission of the message, it deletes the request of the contents retrieval that can not be retrieved because of the failure in the  
25 obtainment from the contents request table 25. If there is any contents retrieved until the middle, it deletes its contents from the contents

accumulator 24.

In the operation of the contents server 3, the external input/output device 32 receives a request of a contents retrieval from the gateway server 2, as shown in Fig. 5. It passes the received request of the contents retrieval to the CPU 31. The CPU 31, after receiving the request of the contents retrieval, instructs the timer device 33 to start the timer. The timer device 33 starts the timer in accordance with the instruction of the CPU 31. The CPU 31 analyzes the received request of the contents retrieval, checks a position of the contents, and retrieves the contents stored in the contents accumulator 34. After retrieving the contents, the CPU 31 instructs the timer device 33 to stop the timer and instructs the external input/output device 32 to transmit the retrieved contents. The timer device 33 stops the timer in accordance with the instruction of the CPU 31. The external input/output device 32 transmits the retrieved contents to the gateway server 2 in accordance with the instruction of the CPU 31.

If the timer of the timer device 33 becomes at the time-out state, the timer device 33 reports the time-out to the CPU 31, as denoted by the symbol 63 of Fig. 6. The CPU 31 receiving the



report of the time-out instructs the external  
input/output device 32 to transmit the message  
indicative of the failure in the contents  
retrieval. The external input/output device 32  
5 transmits the message indicative of the failure in  
the contents retrieval to the gateway server 2 in  
accordance with the instruction of the CPU 31.

The gateway server 2 according to the  
present invention converts the picture contents to  
10 be relayed so that it satisfies the display  
performance of the small terminal 1, and then  
distributes it. It is enough that the small  
terminal 1 can display the picture contents and  
contain the minimum display performance. It is  
15 not necessary that the contents generator is  
conscious of the small terminal 1 and the  
terminals except the small terminal and  
individually generates the picture contents. Even  
in a case of an occurrence of a new type picture  
20 contents, it can be displayed on the small  
terminal 1 by only the correspondence in the  
gateway server 2. As for the small terminal  
having the different display performance, the  
picture contents can be displayed further  
25 comfortably by installing the gateway server for  
each display performance. Thus, this is desirable.

The CPU 21 initially has the data with

regard to the numbers of display pixels and the numbers of display colors of small terminals (not shown) having display performances respectively different from the display performance of the small terminal 1, in addition to them of the small terminal 1. Then, it converts a retrieved picture contents into a contents that can be displayed on one of the small terminals requesting the picture contents in accordance with a portion corresponding to the one of the small terminals requesting the picture contents of the data.

In another embodiment of the gateway server according to the present invention, the gateway server arbitrates a communication between a small terminal and a contents server, and further arbitrates even a communication between a terminal except the small terminal and the contents server. The configuration of the gateway server 2 is similar to that of another embodiment.

In the operation of the small terminal 1, the input device 14 receives the request of the contents retrieval from the user, as shown in Fig. 5. It passes the received request of the contents retrieval to the CPU 11. The CPU 11 instructs the display 15 to display the request of the contents retrieval, and instructs the external input/output device 12 to transmit the request of the contents

retrieval and an information indicating that a self-terminal is a small terminal. The display 15 displays a message indicative of the request of the contents retrieval in accordance with the instruction of the CPU 11. The external input/output device 12 transmits the request of the contents retrieval and the information indicating that the self-terminal is the small terminal, through the network infrastructure 4 to the gateway server 2 in accordance with the instruction of the CPU 11. After the external input/output device 12 transmits the request of the contents retrieval, the CPU 11 instructs the timer device 13 to start the timer. The timer device 13 starts the timer in accordance with the instruction of the CPU 11.

If the external input/output device 12 receives the contents requested by the small terminal 1 from the gateway server 2, the external input/output device 12 passes the received contents to the CPU 11. The CPU 11 receiving the contents instructs the timer device 13 to stop the timer. The timer device 13 stops the timer in accordance with the instruction of the CPU 11.

If the reception of the requested contents is completed, the CPU 11 instructs the display 15 to display the retrieved contents. The display 15

displays the contents in accordance with the instruction of the CPU 11.

If the reception of the requested contents is not completed (51), it again instructs the timer device 13 to start the timer. The timer device 13 starts the timer in accordance with the instruction of the CPU 11. After that, if the reception of the contents is completed, the CPU 11 instructs the timer device 13 to stop the timer, and instructs the display 15 to display the retrieved contents. The timer device 13 stops the timer in accordance with the instruction of the CPU 11. The display 15 displays the contents in accordance with the instruction of the CPU 11.

If the external input/output device 12 receives the message indicative of the failure in the contents retrieval from the gateway server 2, the external input/output device 12 passes this message to the CPU 11, as denoted by the symbols 62, 63 of Fig. 6. The CPU 11 receiving this message instructs the timer device 13 to stop the timer, and instructs the display 15 to display the message indicative of the failure in the contents retrieval. The timer device 23 stops the timer in accordance with the instruction of the CPU 21. The display 15 displays the message indicative of the failure in the contents retrieval, in

accordance with the instruction of the CPU 11.

If the timer of the timer device 13 becomes at the time-out state (61), the timer device 13 reports the time-out to the CPU 11. The CPU 11 receiving the report of the time-out judges as the failure in the contents retrieval, and instructs the display 15 to display the message instructive of the failure in the contents retrieval. The display displays the message of the failure in the contents retrieval in accordance with the instruction of the CPU 11.

In the operation of the gateway server 2, the external input/output device 22 receives the request of the contents retrieval from the small terminal 1, as shown in Fig. 5. It passes the received request of the contents retrieval to the CPU 21. The CPU 21 stores the request of the contents retrieval in the contents request table 25, and instructs the external input/output device 22 to transmit the request of the contents retrieval. If a terminal information is added to the request of the contents retrieval, this terminal information is also stored in the contents request table 25. The external input/output device 22 transmits the request of the contents retrieval to the contents server 3 in accordance with the instruction of the CPU 21.

After the completion of the transmission of the request of the contents retrieval, the CPU 21 instructs the timer device 23 to start the timer. The timer device 23 starts the timer in accordance with the instruction of the CPU 21.

If the external input/output device 22 receives the requested contents from the contents server 3, the external input/output device 22 passes the received contents to the CPU 21. The CPU 21 receiving the contents stores the contents in the contents accumulator 24, and instructs the timer device 23 to stop the timer. The timer device 23 stops the timer in accordance with the instruction of the CPU 21. If the reception of the requested contents is completed, the CPU 21 judges whether or not the received contents is the picture contents. Moreover, it judges whether or not the terminal requesting this contents is the small terminal, in accordance with the terminal information stored in the contents request table 25.

If the reception of the requested contents is not completed (52), the CPU 21 again instructs the timer device 23 to start the timer. The timer device 23 starts the timer in accordance with the instruction of the CPU 21. After that, if the reception of the contents is completed, the CPU 21

judges whether or not the received contents is the picture contents, and instructs the timer device 13 to stop the timer. The timer device 23 stops the timer in accordance with the instruction of the CPU 21.

If it is judged that the received contents is the picture contents and also the terminal requesting this contents is the small terminal (53), and if it is judged that the received contents is the picture contents (53), the CPU 21 retrieves the contents from the contents accumulator 24. It uses the picture contents conversion work area 26, and converts the retrieved contents into the contents satisfying the data with regard to the number of display pixels and the number of display colors initially owned by the CPU 21. It replaces the contents stored in the contents accumulator 24 with the converted contents.

If it is judged that the received contents is not the picture contents, or if it is judged that the terminal requesting this contents is not the small terminal, or if the retrieved contents is already converted into the contents satisfying the number of display pixels of the small terminal 1 and the number of display colors since it is judged as the picture contents, the CPU 21

retrieves the contents from the contents accumulator 24, and instructs the external input/output device 22 to transmit the contents. The external input/output device 22 transmits the contents to the small terminal 1, in accordance with the instruction of the CPU 21. After the external input/output device 22 transmits the contents, the CPU 21 deletes the contents after the end of the transmission from the contents accumulator 24, and deletes the request of the contents retrieval transmitted by the contents request table 25.

If the external input/output device 22 receives the message indicative of the failure in the contents retrieval from the contents server 3 (63), the external input/output device 23 passes this message to the CPU 21, as shown in Fig. 6. The CPU 21 receiving this message instructs the timer device 23 to stop the timer, and instructs the external input/output device 22 to transmit the message indicative of the failure in the contents retrieval. The timer device 23 stops the timer in accordance with the instruction of the CPU 21. The external input/output device 22 transmits the message indicative of the failure in the contents retrieval to the small terminal 1, in accordance with the instruction of the CPU 21.



After the transmission of the message, the CPU 21 deletes the request of the contents retrieval that can not be retrieved because of the failure in the obtainment from the contents request table 25. If  
5 there is any contents retrieved until the middle, it deletes its contents from the contents accumulator 24.

If the timer of the timer device 23 becomes at the time-out state (62), the timer device 23  
10 reports the time-out to the CPU 21. The CPU 21 receiving the report of the time-out instructs the external input/output device 22 to transmit the message indicative of the failure in the contents retrieval. The external input/output device 22  
15 transmits the message indicative of the failure in the contents retrieval to the small terminal 1, in accordance with the instruction of the CPU 21. After the transmission of the message, it deletes the request of the contents retrieval that can not  
20 be retrieved because of the failure in the obtainment from the contents request table 25. If there is any contents retrieved until the middle, it deletes its contents from the contents accumulator 24.

25 In the operation of the contents server 3, the external input/output device 32 receives the request of the contents retrieval from the gateway

server 2, as shown in Fig. 5. It passes the received request of the contents retrieval to the CPU 31. The CPU 31, after receiving the request of the contents retrieval, instructs the timer device 33 to start the timer. The timer device 33 starts the timer in accordance with the instruction of the CPU 31. The CPU 31 analyzes the received request of the contents retrieval, checks the position of the contents, and retrieves the contents stored in the contents accumulator 34. After retrieving the contents, the CPU 31 instructs the timer device 33 to stop the timer, and instructs the external input/output device 32 to transmit the retrieved contents. The timer device 33 stops the timer in accordance with the instruction of the CPU 31. The external input/output device 32 transmits the retrieved contents to the gateway server 2 in accordance with the instruction of the CPU 31.

If the timer of the timer device 33 becomes at the time-out state (63), the timer device 33 reports the time-out to the CPU 31, as shown in Fig. 6. The CPU 31 receiving the report of the time-out instructs the external input/output device 32 to transmit the message indicative of the failure in the contents retrieval. The external input/output device 32 transmits the

message indicative of the failure in the contents retrieval to the gateway server 2, in accordance with the instruction of the CPU 31.

Accordingly, it is not necessary to prepare  
5 the two gateway servers 2 for the small terminal 1  
and the terminal except the small terminal.

In the gateway server according to the present invention, it is possible to display the picture contents in the small terminal, and its processing speed is further fast, and its manufacturing cost is cheap.